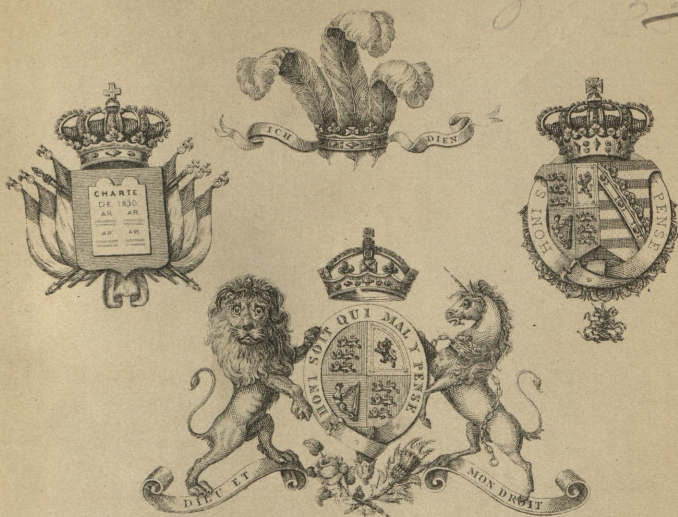


THE COLLODION PROCESS

SIMPLIFIED.

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BY CHARLES HUNT,

CHEMIST AND MANIPULATOR IN THE PHOTOGRAPHIC
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TO HER MAJESTY, PRINCE ALBERT,

THE PRINCE OF WALES,

AND THE ROYAL FAMILIES OF

ENGLAND & FRANCE,

30, PICCADILLY.

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THEORY AND PRACTICE OF THE PHOTOGRAPHIC
REPRODUCTION OF COLOURS BY LIGHT

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INDEX.

	PAGE
Preface	3
Description of the Collodion Process	5
Coating the Plate	8
Exciting the Plate	11
Exposure of the Plate in the Camera	15
Varnishing the Picture	19
Negative Collodion Process	21
Fixing Solution for Negatives	25
Hints, &c.	25
Preparation of the Paper	29
Printing from the Negative	32
The Toning Bath	34
The Fixing Bath	35
Albuminized Paper	36
Weights and Measures	39

ERRATA.

Page 23, for *blowing*, read *pouring*.

Page 18, for *Photo*, read *Proto*.

P R E F A C E .

In this work I purpose to present to the reader a plain and concise method of taking pictures by the most simple of all processes—that of Collodion—and trust that all who may be induced to pursue this beautiful and fascinating art, may be fully repaid for the time and attention they may bestow upon it. As this work is intended for the beginner from the commencement of his photographic career, I have not added anything but what is absolutely necessary for enabling him to understand the different manipulations. Many good works have been from time to time written upon the subject, claiming

the attention of persons more advanced; this work is simply to lay before the reader the result of numberless experiments; and I hope to be able to supply what most beginners stand in need of,—a simple and direct method to pursue—my object being to enable him to overcome the difficulties attending the commencement of Photography. From my own experience, I can positively state that by following the directions given, even though previously unacquainted with the art, the most satisfactory results may be obtained.

CHARLES HUNT.

THE COLLODION PROCESS SIMPLIFIED.

The agent by which such rapid and useful effects are to be obtained, is of recent invention; it is a solution of Gun Cotton in Alcoholised Ether; but as Collodion is now to be obtained from almost all practical chemists, I have not thought it worth while to take the reader through the tedious process of making his own Collodion, as much valuable time would have to be sacrificed; and as beginners are anxious to see the result of their labours, I shall recommend them to purchase their Collodion ready prepared. I would here caution them against the purchase of cheap Collodion, as much is sold under this head that would puzzle the most experienced operator to obtain

any thing like a good picture, and to the beginner it would be almost a sure cause of failure.

I will now describe the process:—the first thing is the preparation of the Glass for the reception of the Collodion. The Glass should be carefully selected, Patent Plate is the best, it should be quite clean and free from spots, they are sold, cut to the size of the Camera frames, by most dealers in Photographic materials.

The next part is the cleaning of the Glass, which is most essential, for if they are not chemically clean, no one, let them be ever so practised a manipulator, can obtain good results, as with all the after care, it is sure to be observed in the finished picture. In fact, so much depends upon perfect cleanliness, that it is impossible to pay too much attention to it. The cloths for cleaning the Glass should be cleansed from all impurities, the most effectual way of doing this, is to soak them in boiling water,

in which some common soda has been dissolved; they are then to be well rinsed in plenty of cold water, and when dry, are fit for use. The leather for polishing the plates should be soaked in cold water, to free it from the dressing that is found in new leathers, care must be taken to avoid the contact of grease at all times; the best material for cloths is fine diaper, from its being free from flue. The best method of cleaning is to pour over the Plate a small quantity of Cyanide of Potassium solution, in the proportions of one drachm to the ounce of water; well rub with a piece of cotton or soft linen rag rolled up into a ball on both sides, then well rinse in plenty of water, and wipe with one of the cloths until all the moisture is removed; then rub until perfectly dry with the second cloth; then lay the leather in the hand, and place the Glass upon it, to give it the final polish, care being taken that the hands may not come in contact with it,

it may then be placed in a box until required for use; and all that is necessary before coating the Plate, is to remove any dust that may be upon it.

COATING THE PLATE.

This operation requires some little skill in the manner of its performance; although easy in practice, it is more difficult to teach by precept than example. Hold the glass horizontally by one of its corners, between the finger and thumb of the left hand, after having freed the neck of the Collodion bottle from any dry pieces of Collodion that may be adhering to it; this is very essential, as they would be carried on to the Plate, and invariably spoil the picture; pour a sufficient quantity of Collodion on the centre of the glass, then by gently tilting the plate firstly towards the thumb, but not so as to touch it, then to the opposite edge of the glass, and then to the other corner, return it into the bottle by the opposite corner

to that which the glass is held, but on the same end. It will be found if sufficient Collodion is poured upon the glass, and held perfectly flat, it will run to each corner with very slight tilting; pour the superfluous Collodion into the bottle, and draw the bottom edge of the glass along the neck of the bottle, in order to correct the tendency the Collodion has to form streaks across the glass plate. The operation of Coating the Plate should be done as quickly as possible, without haste.

The means I generally adopt when a large quantity of Collodion is iodised at a time, is to decant into a small bottle a short time before use, a sufficient quantity for coating a small number of plates, thus avoiding the deposit which causes the spots on the picture.

The operator must not immerse the plate into the bath too quickly, the time varies with the age and make of the Collodion; it would be useless to give

any definite time, that can only be determined by a little experience. It will doubtless be thought strange by the beginner, that I cannot tell him when to immerse it, but he will find that a few trials will be necessary to determine the precise time, it varying from five to ten seconds; in general, a dulness comes over the Collodion which indicates it is ready for the Sensitive Bath.

All the process hitherto described may be performed by day-light, but in all after processes care must be taken to exclude every trace of white light; the best means of doing this is to cover the window of the operating room with folds of stout yellow calico or paper, it is unnecessary to make the room so dark as is generally the case with amateurs, sufficient yellow light may with safety be admitted to carry on the manipulation with ease, as light coming through a yellow medium has but little, if any, chemical effect upon the sensitive plate;

if the operator has no means of admitting light into his room but by the use of a candle, he must not approach too near when coating the plate, as Collodion is highly inflammable. It is advisable to screen the light with a piece of yellow calico.

EXCITING THE PLATE.

The solution required for exciting the plate is made in the following way;—most operators have different methods of preparing the bath, I shall here give the formula as I use it, and after constant experiments find it produces better and more uniform pictures than any other I have tried.

Put 1 ounce of Crystallized Nitrate of Silver into a large bottle, with 6 ounces of Distilled Water, when dissolved, add 2 grains of Iodide of Potassium, this should be dissolved in a small quantity of Distilled Water before adding to the Silver Solution, which will cause a deposit

to form; well shake it, and add 9 ounces more of Distilled Water, it is advisable to let it stand a few hours; then filter through Blotting Paper, and it is ready for use.

I would here caution the beginner that to attain at anything like proficiency, great care and attention is required in the preparation of the bath, and he should as soon as possible make himself acquainted with the method of testing it, as more failures arise from this than any other cause, although a bath prepared in the way I have described, providing everything else is in order, will in all probability produce good pictures; but before we can make sure of obtaining such, it is necessary to test it in the following way:—Obtain some Blue Litmus Paper and dip a small piece into the Nitrate of Silver bath; if after a minute no alteration takes place in the color of the Test Paper, we may conclude the bath is neutral; on the contrary, if the color is

changed to a slight green tint, it is alkaline; but if it changes from blue to a decided red, the bath is acid. A bath to work well, must be at all times slightly acid; the effect on the Test Paper should be a slight Pink hue.

Now to produce this effect, if your bath presents either the alkaline or neutral appearance, is to add one or two drops of pure Glacial Acetic Acid, and to test it with the Litmus Paper between each drop; but if on the other hand it exhibits a decided acid re-action, add drop by drop of Ammonia diluted with five times its bulk of water, until the slight acid re-action is manifested. It would be as well for the beginner to take a picture in all conditions of the bath, it will then enable him to remedy any future difficulty that may arise from it. The bath may be kept in a uniform condition for some length of time, the best way of doing this is to make double the quantity of Solution you may require,

and by returning it into the bottle after each day's use, the equality of the bath is kept up, and the frequent use of filtering avoided, as you can decant the clear portion of it for use.

I have thus endeavoured to explain to the reader the appearance of a good bath, and the remedy to obviate the difficulty the beginner is frequently placed in by the chemical changes that occasionally occur in baths. The Solution I have endeavoured to describe, should be poured into a Gutta-Percha Bath, which should contain a glass dipper, consisting of a piece of Plate Glass about two inches wide, with a piece cemented upon the bottom to prevent the plate from falling off; the glass prepared with Collodion as described, should be rested on the dipper and plunged with one stroke into the Solution contained in the bath; there must be no stoppage in the immersion of the plate, or a mark would be formed across the picture which cannot

be got rid of. Allow the plate to remain about half-a-minute, it may then with safety be lifted up to ascertain the state of the film which will be found of a yellowish colour, having an oily streaky appearance; it must be quickly returned to the bath, and moved up and down, it will be found in about two minutes to have lost the oily appearance which indicates it is ready for removal from the bath, and being held by one of the corners to drain, is then ready to be placed in the dark slide of the Camera; it is advisable to wipe the uncoated side of the plate with a piece of Bibulous Paper, by so doing, the Camera can be kept much cleaner and dryer.

EXPOSURE OF THE PLATE IN THE CAMERA.

The plate is now to be removed as quickly as possible to receive the action of light in the Camera; in this part of the operation, experience is the only guide, as the

time of exposure varies so constantly in our ever-changing climate, that no rule can be given. It is advisable to expose the plate if the light is tolerably good, about five seconds, then take another plate and expose forty seconds, it can only be determined by the appearance of the film under the action of the Developing Solution, whether it has been over or under exposed.

In taking a portrait, it is necessary to have the light equally diffused, and the eyes protected from any great glare of light which would spoil the likeness. The aspect best suited for Photography is the Northern, as it is free from the glare complained of; as most amateurs work in the open air, it is advisable to have a covering over the head.

I shall advise all beginners to commence with positive pictures, and perfect themselves in the Manipulation before commencing negatives; nearly all books written upon the subject recommend different

baths to be used. Now as this is attended with expense and trouble, with slight alteration this may be remedied; the Manipulation for negatives is precisely the same as for positives; but the bath requires to be more acid for the latter, this you must regulate by the directions given at page 10, for testing the bath. I shall scrupulously avoid all technical terms used in Chemistry, nor do I think it necessary to enter into the composition of each article he may use, as the amateur in most cases would be satisfied by producing a good picture, and a complication of various means to produce this and that effect, are more likely to retard than assist him.

When the sitter is arranged to our satisfaction, it is necessary to bring the image to a focus on the Ground Glass of the Camera. We must suppose the plate to have been properly exposed in the Camera, as we are now about to describe the Positive Process; it is then removed into the Operating Room, and the plate taken

from the dark slide by one of the corners, and pour over it a Solution made as follows:—

DEVELOPING FOR POSITIVES.

Photo Sulphate of Iron ...	...	1 Drachm.
Glacial Acetic Acid...	...	1 Ditto.
Nitric Acid	... ..	4 Drops.
Distilled Water	... ..	4 Ounces.

DISSOLVE AND FILTER.

Pour this along the upper edge of the plate, and almost immediately the high lights of the picture will begin to appear, then the half tones, and lastly, but a slight indication of the deep shadows. Here again experience must be the guide when to arrest the action of the Developing Solution. Beginners invariably over-develop their pictures, having a desire to see all the details brought out; the action of the Developing Solution must be stayed before this takes place, as we cannot perceive the drawing in the darker parts until the unchanged portions are removed, it generally requires but a

few seconds to develop a picture by this formula. The picture is to be well washed by pouring a stream of water over it, and the following Solution made in a wide-mouth bottle and poured over the picture, until the veil as it were that obscured the picture is removed.

FIXING SOLUTION.

Cyanide of Potassium 8 Grains.

Water 4 Ounces.

OR,

Hypo Soda 1 Ounce.

Water 3 Ounces,

I know of no greater treat to a Photographer than to see his picture gradually unfold itself and stand out in bold relief. The picture is then to be well washed, and allowed to dry to await the next operation.

VARNISHING THE PICTURE.

The Varnish is to be applied to the Plate in the same way as the Collodion, returning the superfluous portion to the

Bottle, the Plate requires to be warmed for most varnishes by a gentle fire, otherwise it would become chilled, the varnished side of the Plate should be held to the fire for a few minutes to keep up the heat, until the spirit has all evaporated, for when allowed to cool it presents a rough dull surface instead of a bright glossy one. When skilfully done there is great difficulty in determining on which side the picture is taken. Another, and perhaps a better method of Varnishing the Plate, as it is not always that we can have a fire at hand, is by Amber and Chloroform; this Varnish is applied to the Plate in the same way as Collodion: the film is perfectly hard in a few seconds. When the Varnish is quite dry, a Black Varnish is to be poured over it, called Jet Varnish; the Plate requires to stand by a fire, so as to get perfectly dry before handling, or if preferred they can be backed up with Black Velvet; they are then ready for mounting.

I have endeavoured to explain to the beginner the method of taking Positive Pictures, we will now commence with the Negative Process.

NEGATIVE COLLODION PROCESS.

The chief difference to be pursued lies, after exposure, in the developing; it will be necessary to use a different kind of Collodion, which may be obtained at any Photographic Establishment; we suppose the Plate to have been prepared precisely the same as for Positives, but will require about double the amount of exposure in the Camera. Indeed, Positive pictures can be produced with an amount of light that would be quite impossible to obtain a Negative, even with three times the amount of exposure.

The Plate is now to be removed into the Operating Room, and placed carefully upon a Levelling Stand, or may be held by one of its corners. Pour a quantity of

the Pyrogallic Solution (made in the following way) into a clean glass measure,

DEVELOPING SOLUTION FOR
NEGATIVES.

Pyrogallic Acid	...	...	4 grains.
Glacial Acetic Acid	...	...	1 drachm.
Distilled Water	...	...	3 ounces.

Dissolve the Pyrogallic Acid, in the water, the Acetic Acid should be added, and then it should be Filtered through the Bibulous Paper.

then add a solution of Nitrate of Silver, 40 grains to the ounce of water, in proportion of two drops to each drachm, it should be well mixed together with a glass rod, (only sufficient of the two Solutions to develope one Plate should be mixed at a time), and the contents dispersed rapidly over the surface, which may be assisted by blowing with the mouth, the operator must not blow too long in one place, but just sufficient to keep the Solution in motion; directly the fluid is applied

to the Plate, the operator should watch the progress of development with great attention, for it is the only guide the beginner will have to determine the proper amount of exposure the Plate requires in the Camera; it can be ascertained when the picture is sufficiently developed, by holding a piece of white paper underneath the glass Plate, or by looking up through it he can ascertain the amount of intensity obtained; the following remarks may be useful for his guidance until he has had experience as to the time of staying the action of the developing Solution.

If upon blowing on the Solution the image appears slowly, the high lights attaining great intensity before the details of the dress are visible,—it has been under-exposed. Contrary to the fault of over-developing Positives, the beginner invariably under-developes Negatives. If the reverse, the picture appears directly the solution is applied, the lights and shadows coming out at the same time, and the

picture begins to change all over, and only a faint picture is visible by transmitted light,—it has been over exposed.

A picture that has had the right amount of exposure will develope itself in the following way: first the lights, and immediately after the shadows and drapery of the sitter, the lights continue to increase in power, the principal lines in the picture being clearly seen when looked down upon, and when looked through the dark parts will be perfectly transparent and clear, and after using the hypo-sulphate it exhibits a bloom of red upon its surface, and a most beautiful Negative is the result. When properly developed the Plate is to be well washed in plenty of water, this is best accomplished by pouring a gentle stream of water over its surface; care must be taken that the water is not poured from too great a height, or the Collodion will be torn from the Plate.

FIXING SOLUTION FOR NEGATIVES.

Make a Solution of Hypo-Sulphate of Soda in Water as follows :

Hypo-Sulphate of Soda	... ..	2 Ounces.
Water, distilled or rain	... ..	4 Ounces.

This Solution does not require filtering, and may be used several times in succession. Having well washed the plate, the above Solution is to be poured over it, as recommended for Positives, or it may be placed on the Levelling Stand, and a quantity of the Hypo-Sulphate Solution poured over it, until the yellow Iodide is entirely dissolved ; the Plate is again to be well washed and dried, then Varnished as recommended at page 19 for Positives, to protect the film from injury while printing from.

HINTS, &c.

I intend under this head to point out to the beginner the causes of failure he will have to contend with in the Collodion

process, and as far as possible their remedy, and to give such hints as I trust may enable the reader to attain proficiency in this beautiful art, and by attention to the Instructions herein given, I trust will ensure the road to perfect success.

It will be necessary to remind the reader that one-half the failures of beginners are owing in a great measure to a want of cleanliness: it is not very difficult to determine what kind of a picture you may expect to get by seeing the interior of the operating room.

Be sure and clean the necks of your Bottles after each day's use. In weighing solids, it is necessary, especially where Brass Pans are used, to cut two pieces of paper exactly the same size, from the same piece of paper, there is then less fear of anything wrong getting into the Solution.

Funnels, when once used for Hypo-Sulphate of Soda, should be kept for that purpose alone.

Be sure to exclude the faintest ray of white light from your operating room.

Stains on the hands, caused by the Nitrate of Silver, &c., may be removed by rubbing them with Cyanide of Potassium; and the hands must be well washed to remove the Cyanide: it must never be used if the hands are scratched, on account of its poisonous nature.

There is perhaps nothing that gives more trouble to the beginner than the tendency the plate has to become foggy. This arises from various causes, frequently from the Nitrate of Silver Bath becoming alkaline; if such is the state of the bath, it is impossible to get a clear picture, the remedy for which is to add to the bath a few drops of pure Glacial Acetic Acid, as described at page 13. It is sometimes caused by an excess of Iodide of Silver in the bath, this does not often occur, but is more likely to mislead the beginner, as the bath may give an acid re-action when tested with litmus paper, and yet produce foggy pictures. In this case it is advisable

to add to the bath 3 ounces of Distilled Water, which will cause it to become slightly turbid, pass the bath through a filterer, and add 100 grains of Nitrate of Silver to the clear solution, it will then be found to give perfectly clear pictures.

It is also necessary to keep your Bath free from dust, as this often settles upon the surface, and gives rise to a number of spots and blemishes.

Developing Solution should be mixed fresh for each day's use, that is if you wish to depend upon it, as it very readily decomposes.

Diagonal lines and ridges across the plate are caused by the Collodion becoming too thick, when such is the case, pure Sulphuric Ether must be added to reduce the Collodion to its proper consistency, to cause it to flow evenly over the plate, the precautions herein given would appear quite superfluous to the practised manipulator, but let me remind the amateur, it is by strict attention to cleanliness and apparently trivial matters that he can hope to

attain anything worthy of being called Photographics.

PREPARATION OF THE PAPER.

I dare say the beginner is aware, by this time, there is no beauty in negative pictures till printed from; I will therefore commence with the preparation of the paper. Both English and French papers, suitable for the production of Positive pictures, can be obtained from any Photographic Establishment. I have refrained from recommending any particular maker, but the paper selected should be free from specks and blemishes; papers can be obtained ready salted at a very little advance upon plain paper, and saves the amateur some little trouble. But should he prefer salting his own, I have given the formula as follows:—

Pure Chloride of Barium	...	...	5 grains.
Distilled Water	...	...	1 ounce.

OR,

Chloride of Sodium	...	...	3 grains.
Distilled Water	...	...	1 ounce.

The best means of preparing the paper, is by laying the smooth side upwards, upon a soft wood drawing board, lay the glass rod upon the edge of the paper, and pour over either of the above solutions; then draw the rod backwards and forwards until the surface of the paper is entirely covered, allow it to remain about two minutes, it should be then hung up to dry; any number of sheets may be thus prepared, and will keep for an indefinite period if preserved from damp. The paper is to be rendered sensitive by pouring over the previously prepared surface, by means of the glass rod, as before described for salting, the following solution;

Nitrate of Silver	60 grains.
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Distilled Water	1 ounce.
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it is advisable to lay a piece of Bibulous Paper between the drawing board and the prepared paper, to absorb any mixture that may run over the edges, it should be allowed to remain undisturbed for two

minutes, then suspend or hold before a fire to dry, a small piece of Bibulous Paper attached to one of its corners very much facilitates its drying, some operators prefer sensitising the paper by means of the brush, but I think it is not so cleanly or economical, the solution is brushed over the surface, crossing the strokes to ensure an equal coating. Either of the above methods answer very well when small quantities are only used, when larger quantities are prepared, the best means of doing this is by floating, but requires a larger quantity of solution, made of the following strength.

Nitrate of Silver	...	...	...	45 grains.
Acetic Acid	...	...	...	2 drops.
Distilled Water	...	...	...	1 ounce.

Sufficient of the above solution is to be poured into a porcelain, or which is preferable, a glass dish, to the depth of about a quarter of an inch, the paper is then to be taken hold of by its opposite corners,

and one end allowed to rest on the solution, and the other end gradually lowered down, (this should be done very carefully; to prevent air bubbles from forming, which would cause a large blemish on the paper), it should remain on this solution about four minutes, it will not be injured by being left a longer time; it should then be suspended till dry. This paper should be kept in a dark place till required for use. It is advisable not to prepare more than is required for the day's consumption, as the paper will discolour even in a dark room, the paper rendered sensitive by either of the above means is ready for the next operation.

PRINTING FROM THE NEGATIVE.

The Negative is to be laid in a Pressure Frame, the prepared side upwards, and a piece of Paper, as prepared above, sufficiently large to cover the Negative, is to be laid over it, the Paper is now to be brought into contact with

the Plate by means of Screws in the Frame, this should be done in a moderately dark room, and then placed where the light can have free access to it—the time of exposure varying with the intensity of the Negative; the picture should be printed somewhat darker than desired, to counteract the effect of the Toning Bath, which considerably reduces the intensity of it. It may with safety be looked at to ascertain whether it is sufficiently printed, by removing one of the Screws and raising the back of the Pressure Frame; one screw must be kept on the Negative to keep it from shifting its position. If not sufficiently printed, it must be lowered down, and again exposed to the light, until the desired color is attained: it is better to over than under print a picture, as an over-exposed print can be reduced to almost anything; but one cannot improve an under-printed one.

THE TONING BATH.

Hypo-Sulphate of Soda	...	...	4 Ounces.
Water...	...	...	1 Pint.
Chloride of Gold	...	...	12 Grains.

When the Hypo-Sulphate is dissolved, add the Chloride of Gold, this is better dissolved in half-an-ounce of Water, it should then be filtered through Bibulous Paper, and it is then ready for use.

The picture being over-printed as described, is removed from the Pressure Frame, and plunged into the above Solution; the proofs must be watched, and should be removed as soon as the desired tint is obtained.

When first immersed, they will become brown, but will gradually get darker, until they attain a rich purple; the change in a new Bath goes on very rapidly; but after a quantity of proofs have been toned, they require a much longer time in the Bath before the dark colors can be obtained.

FIXING BATH.

When properly toned, they should be removed after well draining, to save the Solution, into a Solution of Hypo-Sulphate of Soda, in the proportion of 1 ounce of the Salt to 10 ounces of Water, the picture should be allowed to remain in the Bath about ten minutes, which will brighten up the picture. It is essential proofs should be submitted to this Bath, if permanency in the proofs is desired; on removal from the fixing bath the picture is to be well washed in three or four waters, and allowed to remain for five minutes in each, and finally to be soaked in a large pan of water for several hours.

I would here caution the amateur that unless the Soda be well washed from the pores of the paper, the pictures will assuredly be spoilt in time by fading; but if proper care and attention is bestowed, this is not likely to occur. After soaking the pictures in plain water they

are to be suspended till dry, or placed between folds of Blotting Paper, and lastly placed between a sheet of Smooth Paper, and a moderately hot iron passed over them.

ALBUMINIZED PAPER.

In using the above Paper we obtain pictures of exquisite finish, and it is deservedly much in favour; I will here give a formula for albuminizing the Paper, should the operator think fit to do so, but would advise him to purchase it ready prepared, as saving a great deal of time and trouble, and I think, when all things are considered, at much less expense. Take any quantity of the Whites of Eggs and add to them an equal bulk of Distilled Water, then add Hydro-chlorate of Ammonia in the proportion of 36 grains, and Iodide of Potassium in the proportion of 1 grain to 2 ounces, the whole is then to be well beaten with an egg beater, and well shaken. Place a double thickness of

muslin in a glass funnel, transfer the froth to it, nearly the whole of it will then subside into a clear liquid, which is then ready for use.

The papers best suited for albuminizing are the French, that made by Canson Freres answers admirably; the paper being selected, and a quantity of the Albumen poured into a perfectly clean dish to the depth of half-an-inch, place the centre of the sheet on the surface of the liquid, and gradually lower the sides until the surface of the paper is in contact with the Albumen, especial care must be taken to exclude all air bubbles; it should not remain on more than a minute, the shorter the time the better if skilfully managed; it should now be pinned to the edge of a shelf to dry, when dry, place the sheet between two pieces of perfectly smooth paper, and pass a moderately hot iron over the back of it.

Paper thus prepared should present a fine glossy surface, and quite free from

patches, this paper will keep for any length of time, and should be of a pure white color; the method of sensitising the Albuminized Paper is precisely the same as directed for the plain paper, of course with the exception of salting. I generally prefer floating for Albuminized Paper, as the glass rod is apt to disturb the albumen on the paper; the fixing process is precisely the same.

In conclusion, I would urge upon the beginner the necessity of attention to cleanliness, and by following attentively the directions given in every minute particular, will enable him to obtain such pleasing results that he will not think his time ill bestowed.

For the convenience of my amateur readers, I have given the Weights and Measures employed in Photography. In solids, where the ounce or drachm is mentioned, the ounce of 480 grains, and the drachm of 60 grains should be employed. In fluids, the measured ounce is to be understood ; it is divided into 8 drachms of 60 minims or drops to each drachm.

20 Grains 1 Scruple.

3 Scruples 1 Drachm.

8 Drachms 1 Ounce.

